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XI.—*On the Mountains of Llanganati, in the Eastern Cordillera of the Quitoian Andes, illustrated by a Map constructed by the late Don Atanasio Guzman.* By RICHARD SPRUCE, Esq.

Communicated by SIR W. J. HOOKER, F.R.G.S.

Read, March 12th, 1860.

IN the year 1857 I travelled from Tarapoto, in Peru, to Baños, in Ecuador, along the rivers Huallaga, Marañm, Pastasa, and Bombonasa to Canelos, and thence overland through the forest to Baños—a journey which occupied me exactly a hundred days. At the Indian village of Andoas, near the confluence of the Bombonasa with the Pastasa, a distant view is sometimes obtained of the Andes of Quito, but during my stay there the sky was too much obscured to allow of any but near objects being seen. On the 21st of May I reached Paca-yacu, below Canelos, and was detained there three weeks in getting together Indians for conveying my goods through the forest, and procuring the necessary provisions for the way. This village stands on a plateau elevated 240 feet above the river Bombonasa, and about 1800 feet above the sea. In fine weather there is a magnificent view of the Cordillera, looking westward from the plateau, but I saw it only once for about a couple of hours in all its entirety. It takes in an angle of about 60°, bounded left and right by forest on adjacent elevations. At my feet lay the valley of the Bombonasa, taking upwards a north-westerly direction; the stream itself was not visible, and audible only when swollen by rains. Beyond the Bombonasa stretched the same sort of boldly undulated plain I had remarked from Androas upwards, till reaching one long low ridge of remarkably equable height and direction (north to south): this is the watershed between the Bombonasa and Pastasa, and the latter river flows along its western foot. A little northward of west from Paca-yacu the course of the Pastasa bends abruptly, and is indicated by a deep gorge stretching westward from behind the said ridge. This gorge has on each side steep rugged hills—spurs of the Cordillera—of from 5000 to 7000 feet high; one of those on the right is called Abitagua, and the track from Canelos to Baños passes over its summit. All this was frequently visible, but it was only when the mist rolled away from the plain, a little after sunrise, that the lofty Cordillera beyond lay in cloudless majesty. To the extreme left (south) rose Sangáy, or the volcano of Macas, remarkable for its exactly conical outline, for the snow lying on it in longitudinal stripes (apparently of no great thickness), and for the cloud of smoke continually hovering over it. A good way to the right was the loftier mountain called “El Altar,” its truncated summit jagged with eight peaks of nearly equal elevation, and











# MAP OF THE MOUNTAINS OF LLANGANATI, IN THE QUITONIAN ANDES.

by Don Atanasio Guzman.

To illustrate a Paper by Richard Spruce Esq.<sup>re</sup>



clad with an unbroken covering of snow, which glittered in the sun's rays like crystal—an altar to whose elevated purity no mortal offering will perhaps ever attain.\* Not far to the right of El Altar, and of nearly equal altitude, stood Tunguragua, a bluff irregular peak with a rounded apex capped with snow, which also descends in streaks far down its sides.† To the right of Tunguragua and over the summit of Abitagua appeared lofty blue ridges, here and there pointed with white, till on the extreme right was dimly visible a snowy cone of exactly the same form as Sangáy, but much more distant and loftier; this was Cotopaxi, one of the most formidable volcanoes on the face of our globe. Far behind Tunguragua, and peeping over its left shoulder, was distinctly visible a paraboloidal mass of unbroken snow; this was Chimborazo, long considered the monarch of the Andes, and though latterly certain peaks in Bolivia are said to have outtopped it, it will be for ever immortalised in men's memories by its association with such names as Humboldt and La Condamine. Thus to right and left of the view I had an active volcano—Cotopaxi I never saw clearly but once, but Sangáy was often visible when the rest of the Cordillera was veiled in clouds, and on clear nights we could distinctly see it vomiting forth flame every few minutes. The first night I passed at Paca-yacu I was startled by an explosion like that of distant cannon, and not to be mistaken for thunder; it came from Sangáy, and scarcely a day passed afterwards without my hearing the same sound once or oftener.

In the month of July I reached Baños, where I learnt that the snowy points I had observed from Paca-yacu, between Tunguragua and Cotopaxi, were the summits of a group of mountains called Llanganati, from which ran down to the Pastaza the densely-wooded ridges I saw to northward. I was further informed that these mountains abounded in all sorts of metals, and that it was universally believed the Incas had deposited an immense quantity of gold in an artificial lake on the flanks of one of the peaks at the time of the Spanish conquest. They spoke also of one Valverde, a Spaniard, who from being poor had suddenly become very rich, which was attributed to his having married an Indian girl, whose father showed him where the treasure was hidden, and accompanied him on various occasions to bring away portions of it; and that Valverde returned to Spain, and, when on his death-bed, bequeathed the secret of his riches to the king. Many expeditions, public and private, had been made to follow the track indicated by

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\* El Altar seen from the western side—from Riobamba, for instance—is very distinctly perceived to be a broken-down volcano, which is by no means the case when seen from the east.

† Tunguragua seen from the north and north-west is an almost symmetrical truncated cone, and the most picturesque peak in the Andes.

Valverde, but no one had succeeded in reaching its terminus ; and I spoke with two men at Baños who had accompanied such expeditions, and had nearly perished with cold and hunger on the paramos of Llanganati, where they had wandered for thirty days. The whole story seemed so improbable that I paid little attention to it, and I set to work to examine the vegetation of the adjacent volcano Tunguragua, at whose north-eastern foot the village of Baños is situated. In the month of September I visited Cotaló, a small village on a plateau at about two-thirds of the ascent of Guayrapata—the hill in front of Tunguragua and above the confluence of the rivers Patate and Chambo. From Cotaló, on a clear night of full moon, I saw not only Tunguragua, El Altar, Condorasto, and the Cordillera of Cubilliú, stretching southwards towards the volcano Sangáy, but also to the eastward the snowy peak of Llanganati. This is one of the few points from which Llanganati can be seen ; it appears again, in a favourable state of the atmosphere, a good way up the slopes of Tunguragua and Chimborazo.

At Baños I was told also of a Spanish botanist, who a great many years ago lost his life by an accident near the neighbouring town of Patate, and that several boxes belonging to him and containing dried plants and manuscripts had been left at Baños, where their contents were finally destroyed by insects.

In the summers of the years 1858 and 1859 I visited Quito and various points in the western Cordillera, and for many months the country was so insecure, on account of internal dissensions, that I could not leave Ambato and Riobamba, where my goods were deposited, for more than a few days together. I obtained however indisputable evidence that the “Derrotero,” or guide to Llanganati, of Valverde had been sent by the King of Spain to the Corregidores of Tacunga and Ambato, along with a Cedula Real, commanding those functionaries to use every diligence in seeking out the treasure of the Incas. That one expedition had been headed by the Corregidor of Tacunga in person, accompanied by a friar, Padre Longo, of considerable literary reputation. The Derrotero was found to correspond so exactly with the actual localities, that only a person intimately acquainted with them could have drawn it up ; and that it could have been fabricated by any other person who had never been out of Spain was an impossibility. This expedition had nearly reached the end of the route, when one evening the Padre Longo disappeared mysteriously, and no traces of him could be discovered, so that whether he had fallen into a ravine near which they were encamped, or into one of the morasses which abound all over that region, is to this day unknown. After searching for the Padre in vain for some days, the expedition returned without having accomplished its object.

The Cedula Real and Derrotero were deposited in the archives of Tacunga, whence they disappeared about twenty years ago. So many people were admitted to copy them that at last some one, not content with a copy, carried off the originals. I have secured a copy of the Derrotero, bearing date August 14th, 1827; but I can meet with no one who recollects the date of the original documents.

I ascertained also that the botanist above alluded to was a Don Atanasio Guzman, who resided some time in the town of Pillaro, whence he headed many expeditions in quest of the gold of Llanganati. He made also a map of the Llanganatis, which was supposed to be still in existence. Guzman and his companions, although they found no deposit of gold, came on the mouths of several silver and copper mines, which had been worked in the time of the Incas, and ascertained the existence of other metals and minerals. They began to work the mines at first with ardour, which soon however cooled down, partly in consequence of intestine quarrels, but chiefly because they became disgusted with that slow mode of acquiring wealth when there was molten gold supposed to be hidden close by; so the mines were at length all abandoned. This is supposed to have taken place early in the present century, but the exact date I can by no means ascertain. Guzman is reported to have met with Humboldt, and to have shown his drawings of plants and animals to that prince of travellers. He died about 1806 or 1808, in the valley of Leytu, about 4 leagues eastward of Ambato, at a small farmhouse called now Leytillo, but marked on his map San Antonio. He was a somnambulist, and having one night walked out of the house while asleep, he fell down a steep place and so perished. This is all I have been able to learn, and I fear no documents now exist which can throw any further light on the story of his life, though a botanical manuscript of his is believed to be still preserved in one of the archives of Quito. I made unceasing inquiries for the map, and at length ascertained that the actual possessor was a gentleman of Ambato, Señor Salvador Ortega, to whom I made application for it, and he had the kindness to have it brought immediately from Quito, where it was deposited, and placed in my hands; I am therefore indebted to that gentleman's kindness for the pleasure of being able to lay the accompanying copy of the map before the Geographical Society.

The original map is formed of eight small sheets of paper of rather unequal size (those of my copy exactly correspond to them) pasted on to a piece of coarse calico, the whole size being 3 ft. 10½ in. by 2 ft. 9 in. It is very neatly painted with a fine pencil in Indian ink—the roads and roofs of houses red, but it has been so roughly used that it is now much dilapidated, and the names,

though originally very distinctly written, are in many cases scarcely decipherable: in making them out I have availed myself of the aid of persons familiar with the localities and with the Quichua language. The attempt to combine a vertical with a horizontal projection of the natural features of the country has produced some distortion and dislocation, and though the actual outline of the mountains is intended to be represented, the heights are much exaggerated, and consequently the declivities too steep. Thus the apical angle of the cone of Cotopaxi (as I have determined it by actual measurement) is  $121^{\circ}$ , and the slope (inclination of its surface to the horizon)  $29\frac{1}{2}^{\circ}$ ; while on Guzman's map the slope is  $69\frac{1}{4}^{\circ}$ , so that the actual angle is only three-sevenths of what he has represented it, and we may assume a corresponding correction needed in all the other mountains delineated.\*

The whole map is exceedingly minute, and the localities mostly correctly named, but there are some errors of position, both absolute and relative, such that I suppose the map to have been constructed mainly from a simple view of the country, and that no angles and very few compass-bearings have been taken. The margins of the map correspond so nearly with the actual parallels and meridians, that they may be assumed to represent the cardinal points of the compass, as on an ordinary map, without sensible error.

The country represented extends from Cotopaxi on the north to the base of Tunguragua on the south, and from the plain of Callo (at the western foot of Cotopaxi) on the west to the river Puyu, in the forest of Canelos, on the east. It includes an area of something less than an equatorial degree, namely, that comprised between  $0^{\circ} 40'$  and  $1^{\circ} 33'$  s. lat., and between  $0^{\circ} 10'$  w., and near  $0^{\circ} 50'$  E. of the meridian of Quito. In this space are represented six active volcanos (besides Cotopaxi), viz. :—

1. El Volcan de los Mulatos, east a little south from Cotopaxi, and nearly on the meridian of the Rio de Ulva, which runs from Tunguragua into the Pastasa. The position of this volcano corresponds to the Quilindaña of most maps—a name which does not occur on Guzman's, nor is it known to any of the actual residents of the country. A group of mountains running to north-east, and terminating in the volcano, is specified as the Cordillera de los Mulatos: it is separated from Cotopaxi by the Valle Vicioso.

2. El Volcan de las Margasitas south-east by east from Los Mulatos, and a little east of north from the mouth of the Rio Verde Grande. "Margasitas" (more properly Marquesitas) corresponds nearly to the term "pyrites," and is a general name for the sulphates of iron, copper, &c.

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\* The apical angle of Tunguragua—the steepest mountain I ever climbed—is  $92\frac{1}{2}^{\circ}$ , and the slope  $43\frac{1}{4}^{\circ}$ .

3. Zunchu-urcu, a smaller volcano than Margasitas, and at a short distance south-south-east of it. "Zunchu" is the Quichua term for mica or talc.

4. Siete-bocas, a large mountain, with seven mouths vomiting flame, south-west by south from Margasitas, west by south from Zunchu. Its southern slope is the Nevado del Atilis.

5. Gran Volcan del Topo, or Yurag-Llanganati, nearly east from Siete-bocas and south-west from Zunchu. A tall snowy peak at the head of the river Topo, and the same as I saw from Cotaló. It is the only one of the group which rises to perpetual snow, though there are many others rarely clear of snow; hence its second name Yurag (White) Llanganati.\*

The last four volcanos are all near each other, and form part of what Guzman calls the Cordillera de Yurag-urcu, or Llanganatis of the Topo.

North-east from the Volcan del Topo, and running from south-east to north-west, is the Cordillera de Yana-urcu, or the Llanganatis of the Curaray, consisting chiefly of a wooded mountain with many summits, called Rundu-uma-urcu or Sacha-Llanganati.

6. Jorobado, or the Hunchback, south-south-west half west from Yurac-Llanganati, and between the river Topo and the head of the greater Rio Verde.

I have conversed with people who have visited the Llanganati district as far as forty years back, and all assure me they have never seen any active volcano there; yet this by no means proves that Guzman invented the mouths vomiting flame which appear on his map. The Abbé Velasco, writing in 1770,† says of Tunguragua, "it is doubtful whether this mountain be a volcano or not," and yet three years afterwards it burst forth in one of the most violent eruptions ever known. I gather from the perusal of old documents that it continued to emit smoke and flame occasionally until the year 1780. Many people have assured me that smoke is still seen sometimes to issue from the crater—I was doubtful about the fact, until having passed the night of November 10th, 1857, at a height of about 8000 feet on the northern slope of the mountain, I distinctly saw at daybreak (from 5½ to 6½ A.M.) smoke issuing from the eastern edge of the truncated apex.‡ In ascending on the same side, along the course of the great stream of lava that overwhelmed the farm of Juivi and

\* Villavicencio gives its height as 6520 varas (17,878 E. ft.), in his 'Geografia del Ecuador,' from a measurement (as he says) of Guzman, but does not inform us where he obtained his information.

† 'Historia de Quito.'

‡ The same morning (Nov. 11th), at 4 A.M., I observed a great many shooting-stars in succession, all becoming visible at the same point (about 40° from the zenith), proceeding along the arc of a great circle drawn through Orion's Belt and Sirius, and disappearing behind the cone of Tunguragua.

blocked up the Pastasa, below the mouth of the Patate, for eight months, we come successively on six small fumaroli, from which a stream of thin smoke is constantly issuing. People who live on the opposite side of the valley assert that they sometimes see flame hovering over these holes by night. The inhabitants of the existing farm of Juivi complain to me that they have been several times alarmed of late (especially during the months of October and November, 1859) by the mountain "bramando" (roaring) at night. The volcano is plainly therefore only dormant, not extinct, and both Tunguragua and the Llanganatis may any day resume their activity.

Returning to the map, let us trace briefly its hydrography. The actual source of the Napo is considered to be the Rio del Valle, which runs northward through the Valle Vicioso, on the eastern side of Cotopaxi. Its large tributary the Curaray (written Cunaray by Guzman) rises only a few miles more to the south, in the Cordillera de los Mulatos, in several small streams which feed the lake Zapalá (a mile or more across) and issuing from its eastern extremity run east-south-east to Yana-cocha (Black Lake), a large body of water a league and a-half long by two miles broad. After passing this lake the river takes the name of Desaguadero de Yana-cocha, and lower down that of Rio de las Sangurimas, receiving in its course (besides smaller streams) the Rio de los Mulatos from the north, and a good way farther down the Rio de los Llanganatis, coming from the south along a deep ravine (Cañada honda) between Rundu-umu and the Volcan del Topo. Beyond this and nearly north by east from the Volcan del Topo it is joined from the north by a considerable stream, the Curaray Segundo or Rio de las Flechas, and takes the name of Rio Grande de los Curarayes. The general course of the Curaray is eastward, as is also that of the Napo, and although the two rivers diverge so little from each other, they run as it were side by side through four degrees of longitude ere they meet.

The map is traversed from the north-western corner by a large stream, the Patate, rising in the western cordillera near Ilinisa, and running east-south-east through the central *callejon* (the lane between the two cordilleras) to a little south of Cotopaxi, where it reaches the base of the eastern cordillera, which it thenceforth separates from the callejon until it unites with the Chambo, at the foot of Tunguragua, to form the Pastasa. It receives all the streams flowing from the eastern side of the western cordillera, from Ilinisa to Chimborazo, of which the principal is the Ambats. From Cotopaxi the western edge of the eastern cordillera has a general direction of south by east. It consists of elevated paramos sown with lakes and morasses, and rarely covered with snow, which sink down to the river Patate, and from Pillaro southward have

many deep-wooded ravines on the slope. From Pillaro northward they sink down into the plain quite bare of wood. The whole range is vulgarly called "Paramos de Pillaro." The principal tributaries of the Patate entering from these mountains are the Aláquis, which comes in a little north of Tacunya, and whose bed is subject to sudden enlargement from the melting of the snows on Cotopaxi, interrupting all communication with the capital; the Guapanti, whose sources are a number of lakes lying south of Lake Zapalá, their united waters flowing westward through the large lake Pisayambu, and entering the Patate near the village of San Miguel; and the Cusatágua, which comes down through a black wooded valley from the Cerro de los Quinuales; on the left it is joined by a stream which, about midway, forms a high cascade of two leaps, called Chorrera de Chalhaurca (Fish-hill Fall): this cascade is visible from and nearly east of Ambato.

As the great mineral districts of Llanganati, occupying the northern half of the map, was repeatedly travelled over by Guzman himself, it is fuller of minute detail than the rest; and I am assured by those who have visited the actual localities that not one of them is misplaced on the map; but the southern portion is much dislocated; and, as I have traversed the whole of it, I will proceed to make some remarks and corrections on this part of the map. From Chimborazo (lying a few miles to westward of the village of Mocha) a spur or knot is sent off to the eastward, containing the mesetas or paramos of Sanancajas and Sabañán and the heights of Igualáta. Guambaló, Múlmúl, and Guayrapata, which last slopes abruptly down to the junction of the Chambo and Patate. These are so much transposed in Guzman's map that I have omitted them in my copy, with the exception of the last. Even the environs of Ambato are much distorted; for the river Pachanlica actually unites with the Ambato a little above the mouth of the latter, instead of running direct into the Patate, some distance below the Ambato, as it is made to appear on the map.

Let us now descend the valley of the Pastasa from Guayrapata.\* The easterly wind, due to the earth's rotation, is distinctly felt along the Amazon so long as that river preserves an enormous width, and its course presents no abrupt sinuosities; but in its upper part, and on most of its tributaries, the wind is variable, and owes its modifications partly to local circumstances. In ascending the valley of the Pastasa from the roots of the Andes, one begins to feel the general wind again at a height of about 4000 feet, and, on coming out on the top of Guayrapata (9000 to

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\* *Guayra-pata* = margin (or beginning) of the wind; thus, *Sacha-pata* = edge of the wood; *Cocha-pata* = margin of the lake.

10,000 feet), the easterly wind (blowing up the gorge of Baños) strikes with tremendous force against that barrier, which is almost continually veiled in mist. The forest which crowns it is so densely hung with mosses as to be almost impenetrable; and one is forcibly struck by the contrast on emerging from the humidity and vigorous vegetation of Guayrapata to the arid sandy plains extending towards Pelileo and Ambato.

The Chambo, which flows at the base of Guayrapata, is a larger stream than the Patate (though Guzman's map represents it much smaller), and takes its origin from the volcano Sangay. The steep descent from Guayrapata to the river is 3000 feet in perpendicular height, and occupies the traveller two hours to descend whether mounted or on foot; but from the opposite margin of the river rises the majestic cone of Tunguragua in an unbroken slope of full 11,000 feet perpendicular! Proceeding eastwards from the confluence of the two rivers, the first stream which enters to swell their united waters is the Lligua coming from the north. Below this, and on the right bank, near the village of Baños, a small stream of tepid water, the Vascún, comes from Tunguragua. Before the last eruption of Tunguragua (April 23rd, 1773) a larger stream came down from the mountain and watered the farm of Juívi, in the angle between the Chambo and Pastasa; but the lava which descended on that side buried the farm, and since then the rivulet has been dry, though its bed is still traceable wherever not covered up by the lava. The water now finds its way through a subterranean channel, and bursts out in considerable volume on the very margin of the Pastasa, beneath the lava which is there heaped up to the height of more than a hundred feet. Not a single stream waters now the northern side of Tunguragua, all the way from Baños to Puela (half a day's journey), though several gush out of the cliff on the right bank of the Chambo.

A little above Baños, and on the same side of the river, stand a few cottages called Pitíti (the cleft), because the Pastasa at that point foams through a narrow, tortuous chasm from 150 to 200 feet deep.

Below Baños, and on the opposite (the left) bank, enters the Illúchi, whose course is parallel to that of the Lligua. The next stream, the Rio de Ulva, is of considerable volume, and comes down from the snows on the north-eastern side of Tunguragua.

A very little below the mouth of the Ulva, and on the opposite bank enters a still larger stream, the Rio Verde Primero, which descends from the paramos of Llanganati.

Thus far there has been little to correct in this part of the map; but the next tributary of the Pastasa therein indicated is now called the Rio de Agoyán; and the farm of Agoyán occupies the

site marked on the map "La Yunguilla." There is no river called Yunguilla, and the farm known by that name is actually on the farther side of the next river (the Rio Blanco); while the farm of Antombós is at the eastern foot of the hill called El Sapotal, and on a smaller stream than the Rio Blanco. Exactly opposite Antombós the river Chinchin falls over a high cliff into the Pastasa.

The last bridge across the Pastasa is above the mouth of the Agoyán: on passing it we have fairly entered the Montaña, or Forest, of Canelos. A little above the mouth of the Rio Blanco is the Chorrera de Agoyán, one of the finest waterfalls in South America, where the Pastasa is precipitated over a semicircular cliff, deeply excavated to the left of the fall, a height of about 150 feet.

Continuing along the left bank of the Pastasa, we next reach the Rio Verde Segundo—now better known as the Rio Verde Grande—which comes from the Cordillera de Pucarumi (Red-stone Ridge), running south of the snowy Llanganati. There is now a fine cane-farm near the mouth of the Rio Verde, where the existing track to Canelos passes. The river is unfordable, and has to be crossed at a narrow place by throwing poles across from cliff to cliff.

The prevailing rock in the Gorge of Baños (as this deep, narrow valley may well be called) is mica-schist, though a hard, compact, black, shining, volcanic rock protrudes in many places, especially at the bridges of Baños and Agoyán.

The next river marked on the map is the Rio Colorado, now known as the Rio Mapóto, but well meriting its ancient name by its red margins and the red stones in its bed, coloured by a ferruginous deposit. At its mouth a broad beach (Playa de Mapoto) extends down the Pastasa for near 2 leagues: this beach is never entirely covered with water even in the highest floods; and it bears great quantities of the wax-tree called "laurél" (*Myrica cerifera*). But the Rio Colorado, instead of being at the short distance from the Rio Verde represented in the map, is as far apart from it as the Rio Verde is from the bridge of Agoyán; and from the Rio Verde to Mapoto is a good day's journey, as is also the distance from Mapoto to the river Topo. It is true that the Rio Verde and Topo, though so wide apart at the mouth, may converge in the upper part (as is represented in the map); but I much suspect that the eastern portion of the map is much contracted in longitude, although, from the comparative paucity of details, the contrary might seem to be the case.

The Topo is the largest of all the upper tributaries of the Pastasa. In the time of Guzman it seems to have been passed by a Ta-

ravita\* a good way up, but the modern track to Canelos crosses it at only 200 yards from the mouth. The Topo, as far as any one has been up it, is one continued rapid; and where it is crossed nothing is to be seen but rocks and foam, while the shock of its waters makes the very ground tremble. To pass over it bridges of bamboo have to be thrown from the margin to rocks in the middle, and thence to the opposite side, so that in all four bridges are needed; but a very slight flood lays one of the rocks under water, and then it is impossible to rest a bridge on it.

Only a league below the mouth of the Topo enters the Shuña, a river of little less volume than the former; but as there is a point on each side, where the rocks advance considerably into the stream, it admits of being passed by a single bridge. A flood, however, renders it equally impassable as the Topo.

When I journeyed from Canelos to Baños, I found the Shuña somewhat swollen, and crossed it with difficulty; but when I reached the Topo, I found one of the rocks, on which it is customary to rest a bridge, covered with water. My party consisted of sixteen persons, for whose sustenance every article of provision had to be carried along with us. We waited two days: the river, instead of lowering, continued to rise; our provisions were nearly exhausted, and we saw ourselves exposed to perish of hunger. In this dilemma we found a place a little higher up the river, where we determined to attempt the passage by means of three bridges. On making the experiment, we found the distance between the two rocks in the middle so great that the bamboos barely rested with their points against the side of the opposite rock instead of on the top of it; and when a man walked over them they bent with his weight into the water, whose foaming surges threatened to wash him off; and there was obviously no hope of any one passing with the load of one of my boxes. However, a thunder-storm with heavy rain came on, and, seeing no other chance of saving our lives except by risking the passage of the frail bridges, without loss of time I resolved to abandon my goods and get over to the other side. We had barely all crossed in safety when the river rose and carried away our bridges. On the third day afterwards we reached Baños, where I sought out practised cargueros, and sent them off to the Topo; but for fifteen days from the date of my crossing it the waters did not subside sufficiently to allow of bridges being thrown over; and when the cargueros, at the end of that time, succeeded in passing to the opposite side, they found the leather covering of my boxes completely

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\* *Taravita*, an aerial ferry, consisting of a number of stout thongs stretched across a river from cliff to cliff, and a sort of basket slung on them, wherein a person sits to be drawn over.

soaked and full of maggots! We had left them under ranchos of *Anthurium*-leaves (for the palms have long ago been exhausted between the Topo and the Shuña); and as the rains had been almost unceasing, the leaves had fallen off the roof upon the boxes and were rotting there. Fortunately the contents of the boxes had sustained very little injury.

Many lives have been lost in the Shuña and Topo; and of those who have fallen into the latter only one has come out alive. But the fate is more horrible of those who, shut up between the Shuña and Topo when both are so much swollen as to be impassable, perish of hunger.

The Shuña, though approaching so near the Topo at its outlet, diverges considerably in its upper part; and, as well as I can make out, its source is not far from those of the Ashpa-yacu and Pindu.

When the Topo and Shuña are passed under favourable circumstances, the traveller on his way to Canelos arrives at an early hour the same day at the Cerro Abitagua, a steep mountain ending to the south in perpendicular cliffs, along the very base of which runs the Pastasa; so that the track is made to pass over the summit of Abitagua; and the ascent and descent on the other side occupy a whole day. The great mass of Abitagua seems alluvial; and from this point downwards no more primitive or igneous rock is seen *in situ*, nor indeed all the way down the Amazon until reaching the volcanic districts of Villa Nova and Santarem. Abitagua is also the last hill of any elevation on the eastern side of the Andes (following the valley of the Pastasa): beyond it the ground sinks in gentle undulations down to the great Amazonian plain. From its summit there is a near view of Llanganati, towards the sources of the Topo; but on two occasions that I have ascended Abitagua the summit of Llanganati has been hidden by clouds, and only its wooded flanks and deep, savage valleys have been visible. The valley of the Shuña can be traced to west and north of Abitagua. In descending the eastern slope of the mountain a fine view is obtained of the Great Plain, extending as far as the sight can reach to the south-east like a sea of emerald, in one part of which the Pastasa is seen winding like a silver band, but at so great a distance that it is impossible to discern whether its course be still obstructed by rocks and whirlpools as at the base of Abitagua.

A good day's journey beyond Abitagua brings us to the Ashpa-yacu, which is also sufficiently large to become unfordable after heavy rains: it does not appear at all on Guzman's map. On the following day the Pindu and Púyu are reached; these rivers are equal in size to Ashpa-yacu, and the two unite at a short distance before they reach the Pastasa. In the space between them are a

few huts and chacras of Jívars Indians, the only habitations between the Rio Verde and Canelos.

Beyond the Rio Púyu (River of Mists) the track diverges from the Pastasa, within hearing of whose surges it has run thus far. It also passes the limits of Guzman's map, and continues with an easterly course along the ridges which separate the basin of the Púyu from that of the Bombonasa, which latter river is finally crossed to reach the village of Canelos situated near its left bank.

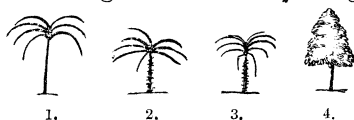
Of the climate of the Forest of Canelos I can only say a few words here. The clouds heaped up against the cordillera by the wind of the earth's rotation descend in daily rains. For three or four months in the year—between November and April—the sun rather predominates over the rain, and this is called "summer;" while for the rest of the year the heavy rains allow the sun to be seen for a very brief interval each day, so they call it "winter," though the climate is in reality a perpetual spring. From the Topo eastward the mist looks as if it were permanently hung up in the trees; and beyond Abitagua wind is scarcely ever felt, except rarely an occasional hurricane; and yet after heavy rains it is customary to find the forest strewn with large green branches. Immense bunches of moss depend from the trees, hiding the very foliage; and when saturated with moisture (which no wind ever shakes out) their weight breaks off the branches whereon they are hung. I am assured by the cargueros that from this cause alone they pass through the forest with fear and trembling after heavy rains; for their load obliges them to travel in a stooping posture, so that they are unable to see the impending danger. Yet with all this moisture the climate is healthy, and I have nowhere suffered so little from going all day in wet clothes.


The track above described is one of the two routes from Ecuador to the Amazon; the other proceeds from Quito to the Indian villages on the Napo, and presents almost equal dangers and difficulties. It is easy to see that the commerce carried on by such routes must be of very slight importance. In another paper I may perhaps discuss the facilities offered and the difficulties to be overcome in the attempt to establish a safe and speedy communication between the Pacific and the Amazon by the various routes which depressions in the Cordillera seem to offer us.

I am unable to give, from personal observation, any account of the geological structure of the country represented in the central and northern portion of the map. The form of the mountains and the rugged peaks leave no doubt that trachyte is the prevailing formation; but some of the rocks seem so regularly columnar that I suppose them to be basaltic; for instance, La Mesa de Ushpa Yuras, La Capilla del Sol and El Docel de Ripalda, all near each other, and a little north of the volcano Margasitas; El Pulpito,

on the south side of the lakes at the head of the river Guapanti ; El Castillojo, north-west of Sieté Bocas, &c.

The parts covered with forest are represented by scattered trees, among which the following forms are easily recognizable :—



No. 1 is the wax-palm (*Palma de Ramos* of the Quitonians—*Ceroxylon andicola* H. et B.\*), which I have seen on Tunguragua up to 10,000 feet. Nos. 2 and 3 are tree-ferns (*Helechos*)—the former a *Cyathea*, whose trunk (sometimes 40 feet high) is much used for uprights in houses ; the latter an *Alsophila* with a prickly trunk, very frequent in the forest of Canelos about the Rio Verde. No. 4 is the *Aliso* (*Betula acuminata*, Kunth), one of the most abundant trees in the Quitonian Andes ; it descends on the beaches of the Pastasa to near 4000 feet, and ascends on the paramos of Tunguragua to 12,000. But there is one tree (represented thus ) , occupying on the map a considerable range of altitude, which

I cannot make out, unless it be a *Podocarpus*, of which I saw a single tree on Mount Abitagua), though a species of the same genus is abundant at the upper limit of the forest in some parts of the western cordillera. A large spreading tree is figured here and there in the forest of Canelos which may be the *Tocte*—a true walnut (*Juglans*), with an edible fruit rather larger than that of the European species. The remaining trees represented, especially those towards the upper limit of the forest, are mostly too much alike to admit of the supposition that any particular species was intended by them.

The abbreviations made use of in the map are—*C<sup>o</sup>* for *Cerro* (mountain), *Cord<sup>a</sup>* for *Cordillera* (ridge), *Mont<sup>a</sup>* for *Montana* (forest), *A<sup>o</sup>* for *Arroyo* (rivulet), *L<sup>a</sup>* for *Laguna*, and *C<sup>a</sup>* for *Cocha* (lake), *Far<sup>m</sup>* for *Farallón* (peak or promontory), *H<sup>a</sup>* for *Hacienda* (farm), and *C<sup>t</sup>* for *Corral* (cattle or sheep-fold).

Mule-tracks (called by the innocent natives “roads”) are represented by double red lines, and foot-paths by single lines. I have copied them by dotted lines.

Having now passed in review the principal physical features of the district, let us return to the Derrotero of Valverde, of which the following is a translation. The introductory remark, or title (not in very choice Castilian), is that of the copyist :—

“ I have adhered closely to the sense and style of the original. (Guide, or

\* I am doubtful if later writers are correct in referring this palm to the genus *Iriarteia*.

Route, which Valverde left in Spain, where death overtook him, having gone from the mountains of Llanganati, which he entered many times, and carried off a great quantity of gold; and the king commanded the corregidores of Tacunga and Ambato to search for the treasure: which order and guide are preserved in one of the offices of Tacunga).

"Placed in the town of Pillaro, ask for the farm of Moya, and sleep (the first night) a good distance above it; and ask there for the mountain of Guapa, from whose top, if the day be fine, look to the east, so that thy back be towards the town of Ambato, and from thence thou shalt perceive the three Cerros Llanganati, in the form of a triangle, on whose declivity there is a lake, made by hand, into which the ancients threw the gold they had prepared for the ransom of the Inca when they heard of his death. From the same Cerro Guapa thou mayest see also the forest, and in it a clump of *Sangurimas* standing out of the said forest, and another clump which they call *Flechas* (arrows), and these clumps are the principal mark for the which thou shalt aim, leaving them a little on the left hand. Go forward from Guapa in the direction and with the signals indicated, and a good way ahead, having passed some cattle-farms, thou shalt come on a wide morass, over which thou must cross, and coming out on the other side thou shalt see on the left-hand a short way off a *jucal* on a hill-side, through which thou must pass. Having got through the *jucal*, thou wilt see two small lakes called "Los Anteojos" (the spectacles), from having between them a point of land like to a nose.

"From this place thou mayest again descry the Cerros Llanganati, the same as thou sawest them from the top of Guapa, and I warn thee to leave the said lakes on the left, and that in front of the point or "nose" there is a plain, which is the sleeping-place. There thou must leave thy horses, for they can go no farther. Following now on foot in the same direction, thou shalt come on a great black lake, the which leave on thy left-hand, and beyond it seek to descend along the hill-side in such a way that thou mayest reach a ravine, down which comes a waterfall: and here thou shalt find a bridge of three poles, or if it do not still exist thou shalt put another in the most convenient place and pass over it. And having gone on a little way in the forest, seek out the hut which served to sleep in or the remains of it. Having passed the night there, go on thy way the following day through the forest in the same direction, till thou reach another deep dry ravine, across which thou must throw a bridge and pass over it slowly and cautiously, for the ravine is very deep; that is if thou succeed not in finding the pass which exists. Go forward and look for the signs of another sleeping-place, which, I assure thee, thou canst not fail to see in the fragments of pottery and other marks, because the Indians are continually passing along there. Go on thy way, and thou shalt see a mountain which is all of *margasitas* (pyrites), the which leave on the left-hand, and I warn thee that thou must go round it in this fashion

☉. On this side thou wilt find a *pajonál* (pasture) in a small plain, which having crossed thou wilt come on a *cañon* between two hills, which is the way of the Inca. From thence as thou goest along thou shalt see the entrance of the *socabón* (tunnel), which is in the form of a church-porch. Having come through the *cañon*, and gone a good distance beyond, thou wilt perceive a cascade which descends from an offshoot of the Cerro Llanganati, and runs into a quaking-bog on the right hand; and without passing the stream in the said bog there is much gold, so that putting in thy hand what thou shalt gather at the bottom is grains of gold. To ascend the mountain, leave the bog and go along to the right, and pass above the cascade, going round the offshoot of the mountain. And if by chance the mouth of the *socabon* be closed with certain herbs which they call "salvaje," remove them,

and thou wilt find the entrance. And on the left-hand side of the mountain thou mayest see the 'Guayra' (for thus the ancients called the furnace where they founded metals), which is nailed with golden nails. And to reach the third mountain, if thou canst not pass in front of the socabon, it is the same thing to pass behind it, for the water of the lake falls into it.

"If thou lose thyself in the forest, seek the river, follow it on the right bank; lower down take to the beach, and thou wilt reach the cañon in such sort that, although thou seek to pass it, thou wilt not find where; climb, therefore, the mountain on the right-hand, and in this manner thou canst by no means miss thy way."

With this document and the map before us let us trace the attempts that have been made to reach the gold thrown away by the subjects of Atahualpa as useless when it could no longer be applied to the purpose of ransoming him from the Spaniards.

Pillaro is a somewhat smaller town than Ambato, and stands on higher ground, on the opposite side of the river Patate, at only a few miles' distance, though the journey thither is much lengthened by having to pass the deep quebrada of the Patate, which occupies a full hour. The farm of Moya still exists; and the Cerro de Guapa is clearly visible to east-north-east from where I am writing. The three Llanganatis seen from the top of Guapa are supposed to be the peaks Margasitas, Zunchu, and el Volcan del Topo. The "*Sangurimas*" in the forest are described to me as trees with white foliage; but I cannot make out whether they be a species of *Cecropia* or of some allied genus. The "*Flechas*" are probably the gigantic arrow-cane, *Gynerium saccharoides* (*Arvoré de frecha* of the Brazilians), whose flower-stalk is the usual material for the Indian's arrows.

The morass (Ciénega de Cubillín), the Jucál,\* and the lakes called "Anteojos," with the nose of land between them, are all exactly where Valverde places them, as is also the great black lake (Yana-cocha) which we must leave on the left-hand. Beyond the lake we reach the waterfall (Cascada y Golpe de Limpis Pongo), of which the noise is described to me as beyond all proportion to the smallness of the volume of water. Near the waterfall a cross is set up with the remark underneath, "Muerte del Padre Longo"—this being the point from which the expedition first spoken of regressed in consequence of the Padre's sudden disappearance. Beyond this point the climate begins to be warm; and there are parrots in the forest. The deep, dry quebrada

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\* *Júco* is the name of a tall, solid-stemmed grass, usually about twenty feet high, of which I have never seen the flower, but I take it to be a species of *Gynerium*, differing from *G. saccharoides* in the leaves being uniformly disposed on all sides and throughout the length of the stem, whereas in *G. saccharoides* the stem is leafless below and the leaves are distichous and crowded together (almost equitant) near the apex of the stem. The *Júco* grows exclusively in the temperate and cool region, from 6000 ft. upwards, and is the universal material for laths and rods in the construction of houses in the Quitonian Andes.

(Quebrada honda), which can be passed only at one point—difficult to find, unless by throwing a bridge over it—is exactly where it should be; but beyond the mountain of Margasitas, which is shortly afterwards reached, no one has been able to proceed with certainty. The Derrotero directs it to be left on the left hand; but the explanatory hieroglyph puzzles everybody, as it seems to leave the mountain on the right. Accordingly nearly all who have attempted to follow the Derrotero have gone to the left of Margasitas, and have failed to find any of the remaining marks signalized by Valverde. The concluding direction to those who lose their way in the forest has also been followed; and truly, after going along the right bank of the Curaray for some distance, a stream running between perpendicular cliffs (Cañada honda y Rivera de los Llanganatis) is reached, which no one has been able to cross; but though from this point the mountain to the right has been climbed, no better success has attended the adventurers.

“Socabon” is the name given in the Andes to any tunnel, natural or artificial, and also to the mouth of a mine. Perhaps the latter is meant by Valverde, though he does not direct us to enter it. The “Salvaje” which might have grown over and concealed the entrance of the Socabon, is *Tillandsia usneoides*, which frequently covers trees and rocks with a beard 30 or 40 feet long.

Comparing the map with the Derrotero, I should conclude the cañon, “which is the Way of the Inca,” to be the upper part of the Rivera de los Llanganatis. This cañon can hardly be artificial, like the hollow way I have seen running down through the hills and woods on the western side of the Cordillera, from the great road of Asuay, nearly to the river Yaguachi. “Guayra,” said by Valverde to be the ancient name for a smelting-furnace, is now-a-days applied only to the wind. The concluding clause of this sentence, “que son tachoneados de oro,” is considered by all competent persons to be a mistake for “que es tachoneado de oro.”

If Margasitas be considered the first mountain of the three to which Valverde refers, then the Tembladál or Bog, out of which Valverde extracted his wealth, the Socabon and the Guyra are in the second mountain, and the lake wherein the ancients threw their gold in the third.

Difference of opinion among the gold-searchers as to the route to be pursued from Margasitas would appear also to have produced quarrels, for we find a steep hill east of that mountain, and separated from it by Mosquito Narrows (Chushpi Pongo), called by Guzman “El Peñon de las Discordias.”

If we retrace our steps from Margasitas till we reach the eastern margin of Yana-cocha, we find another track branching off to northward, crossing the river Zapalá at a point marked Salto de

Cobos, and then following the northern shore of the lake. Then follow two steep ascents, called respectively "La Escalera" and "La Subida de Ripalda," and the track ends suddenly at the river coming from the Inca's Fountain (La Pila del Inca), with the remark "Sublevacion de los Indios—Salto de Guzman," giving us to understand that the exploring party had barely crossed the river when the Indians rose against them, and that Guzman himself repassed the river at a bound. These were probably Indians taken from the towns to carry loads and work the mines; they can hardly have been of the nation of the Curarayes, who inhabited the river somewhat lower down.

A little north and east of the Anteojos there is another route running a little farther northward and passing through the great morass of Illubamba, at the base of Los Mulatos, where we find marked El Atolladero (the Bog) de Guzman, probably because he had slipped up to the neck in it. Beyond this the track continues north-east, and after passing the same stream, as in the former route, but never to its source in the Incas fountain, there is a tambo called San Nicolas, and a cross erected near it marks the place where one of the miners met his death (Muerte de Romero). Another larger cross (La Cruz de Romero) is erected farther on at the top of a basaltic mountain, called El Sotillo. At this point the track enters the Cordillera de las Margasitas, and on reaching a little to the east of the meridian of Zunchu-urcu, there is a tambo with a chapel, to which is appended the remark, "Destacamento de Ripalda y retirada per Orden Superior." Beyond the fact thus indicated, that one Ripalda had been stationed there in command of a detachment of troops, and had afterwards retired at the order of his superiors, I can give no information.

There are many mines about this station, especially those of Romero just to the north, those of Viteri to the east, and several mines of copper and silver which are not assigned to any particular owner. Not far to the east of the Destacamento is another tambo, with a cross, where I find written, "Discordia y Consonancia con Guzman," showing that at this place Guzman's fellow-miners quarreled with him, and were afterwards reconciled. East-north-east from this, and at the same distance from it as the Destacamento, is the last tambo on this route, called El Sumadal, on the banks of a lake, near the Rio de las Flechas. Beyond that river, and north of the Curaray, are the river and forests of Gancaya.

Another track running more to the north than any of the foregoing, sets out from the village of San Miguel, and passes between Cotopaxi and Los Mulatos. Several tambos, or huts for resting in, are marked on the route, which ends abruptly near the Minas de Pinel (north-east from Los Mulatos), with the following remark

by the author—"Conspiracion contra Conrado y su acelerado regreso," so that Conrado ran away to escape from a conspiracy formed against him, but who he was, or who were his treacherous companions, it would now perhaps be impossible to ascertain.

Along these tracks travelled those who searched for mines of silver and other metals, and also for the gold thrown away by the subjects of the Inca. That the last was their principal object, is rendered obvious by the carefulness with which every lake has been sounded, that was at all likely to contain the supposed deposit.\*

The mines of Llanganati, after having been neglected for half a century, are now being sought out again with the intention of working them; but there is no single person at the present day able to employ the labour and capital required for successfully working a silver mine, and mutual confidence is at so low an ebb in this country that companies never hold together long. Besides this, the gold of the Incas never ceases to haunt people's memories; and at this moment I am informed that a party of explorers who started from Tacunga imagine they have found the identical Green Lake of Llanganati, and are preparing to drain it dry. If we admit the truth of the tradition that the ancients smelted gold in Llanganati, it is equally certain that they extracted the precious metal in the immediate neighbourhood; and if the Socabon of Valverde cannot at this day be discovered, it is known to every one that gold exists at a short distance, and possibly in considerable quantity, if the Ecuatoreans would only take the trouble to search for it, and not leave that task to the wild Indians, who are content if, by scooping up the gravel with their hands, they can get together enough gold to fill the quill which the white man has given them as the measure of the value of the axes and lance-heads he has supplied to them on trust.

The gold region of Canelos begins on the extreme east of the map of Guzman, in streams rising in the roots of Llanganati and flowing to the Pastasa and Curaray,† the principal of which are the Bombonasa and Villano. These rivers, and their smaller tributaries, have the upper part of their course in deep ravines, furrowed in soft alluvial sandstone-rock, wherein blocks and pebbles of quartz are interspersed, or interposed in distinct layers. Towards their source they are obstructed by large masses of quartz and other rocks; but as we descend the stones grow fewer, smaller, and more rounded, until towards the mouth of the Bombonasa, and thence throughout the Pastasa, not a single stone of the smallest size is to be found. The beaches of the Pastasa consist almost entirely of

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\* The name Curaray itself may be derived from "curi," gold.

† The soundings of the lakes are in Spanish varas, each near 33 English inches.

powdered pumice brought down from the volcano Sangay by the river Palora. When I ascended the Bombonasa, in the company of two Spaniards, who had had some experience in mining, we washed for gold in the mouth of most of the rivulets that had a gravelly bottom, as also on some beaches of the river itself, and never failed to extract a few fragments of that metal. All these streams are liable to sudden and violent floods. I once saw the Bombonasa at Paca-yacu, where it is not more than 40 yards wide, rise 18 feet in 6 hours. Every such flood brings down large masses of loose cliff, and when it subsides (which it generally does in a few hours) the Indians find a considerable quantity of gold deposited in the bed of the stream.

The gold of Canelos consists almost solely of small particles (called "chispas"—sparks), but as the Indians never dig down to the base of the wet gravel, through which the larger fragments of gold necessarily percolate by their weight, it is not to be wondered at that they rarely encounter any such. Two attempts have been made, by parties of Frenchmen, to work the gold-washings of Canelos systematically. One of them failed in consequence of a quarrel which broke out among the miners themselves, and resulted in the death of one of them. In the other, the river (the Lliquino) rose suddenly on them by night and carried off their canoes (in which a quantity of roughly-washed gold was heaped up), besides the Long Tom and all their other implements.

I close this memoir by an explanation of the Quichua terms which occur most frequently on the map.

Spanish authors use the vowels *u* and *o* almost indiscriminately in writing Quichua names, although the latter sound does not exist in that language; and in some words which have become grafted on the Spanish, as spoken in Peru and Ecuador, the *o* has supplanted the *u* not only in the orthography but in the actual pronunciation, as, for instance, in Pongo and Cocha, although the Indians still say "Chimbu-rasu," and not "Chimborazo"—"Cutu-pacsi," or "Cutu-pagsi," and not "Cotopaxi." The sound of the English *w* is indicated in Spanish by *gu* or *hu*; that of the French *j* does not exist in Spanish, and is represented by *ll*, whose sound is somewhat similar; thus "Lligua" is pronounced "Jiwa." "Llanganati" is now pronounced with the Spanish sound of the *ll*, but whether this be the original mode is doubtful. An unaccented terminal *e* (as in Spanish *verde*) is exceedingly rare in Indian languages, and has mostly been incorrectly used for a short *i*; thus, if we wish to represent the exact pronunciation, we should write "Casiquiari," "Ucayali," and "Llanganati"—not Casiquiare, Ucayale, Llanganate.

"Llanganati" may come from "llánga," to touch, because the group of mountains called by that name touches on the sources of

the rivers all round; thus, on Guzman's map, we find "Llanganatis del Rio Verde"—"Llanganatis del Topo"—"Llanganatis del Curaray," for those sections of the group which respectively touch on the Rio Verde, the Topo, and the Curaray. The following are examples of the mode of using the verb "llanga." "Áma llangáichu!"—"Touch it not!" "Imapág llancángui?"—"Why do you touch it;" or "Pitag llancaynirca?"—"Who told you to touch it?" And the answer might be "Llancanatág chári-cárca llancarcáni."—" [Thinking] it might be touched, I touched it."

It is to be noted that the frequent use of the letter *g*, in place of *c*, is a provincialism of the Quitonian Andes, where (for instance) they mostly say "Inga" instead of "Inca." But in Maynas the *c* is used almost to the exclusion of the *g*; thus "yúrag," white, and "pítag," who, are pronounced respectively "yurac" and "pitac" in Maynas.

"Tungurágua" seems to come from "tungúri," the ankle-joint, which is a prominence certainly, though scarcely more like the right-angled cone of Tunguragua, than the obtuse-angled cone of Cotopaxi is like a wen ("coto" or "cutu").

Of the termination "agua" (pron. "awa") I can give no explanation.

"Cungúri," in Quichua, is the knee; thus an Indian would say "Tunguri-mánta cunguli-cáma llustirishcáni urmáshpa," *i. e.*, "In falling ('urmashpa') I have scrubbed off the skin from the ankle to the knee."

Among rustics of mixed race, whose language partakes almost as much of Quichua as of Spanish, it is common to hear such expressions as "De tunguri á cunguri es una cola llaga."—"From the ankle to the knee is a continuous sore."

The following words occur repeatedly on the map:—

"Ashpa" (in Maynas "Allpa"), earth. "Urcu," mountain. "Rumi," stone. "Cócha (cucha)," lake.

"Yácu," river. "Ucsha," grass, or grassy-place ("Pajónal" Sp.). "Póngo (pungu)," door or narrow entrance.

"Cúchu," corner. "U'ma," head. "Paccha," cataract.

"Cúri," gold. "Cúlqui," silver. "Alquímia," copper. "Ushpa," ashes.

"Chíri," cold. "Yúnga," warm, from which the Spaniards have formed the diminutive "Yunguilla," warmish, applied to many sites where the sugar-cane begins to flourish.

"Yúrag," white. "Yána," black. "Púca," red. "Quilla," yellow.

"I'shcai," two; ex. "I'shcai-guáuqui," the Two Brothers; a cloven peak to the east of Los Mulatos. "Chunga," ten; ex. 'Chunga-uma," a peak with ten points, a little to south of "Ishcai-

guaquiqui." "Parca," double; thus a hill which seems made up of two hills united, is called "Parca-urcu."

"Angas," a hawk. "Ambátu," a kind of toad.

"Sácha," forest. "Cáspi," tree. "Yúras," herb. "Quínua," the "*Chenopodium Quinoa*," cultivated for its edible seed. "Pujín," hawthorn (various species of *Cratægus*); thus "Moñtana de Pujines," Hawthorn Forest; "Cerro Pujin el chico," Little Hawthorn-hill. "Cubillín," a sort of Lupine, found only on the highest paramos. It gives its name to a long ridge of the eastern Cordillera, mostly covered with snow, extending from Condorasto and El Altar towards Sangay. "Totorra," a large bulrush from which mats are made; hence "Totorrál," a marsh full of bulrushes. "Sara," maize.

"Tópo" is the name given in Maynas to the Raft-wood trees, species of *Ochroma* (of the N. O. *Bombacææ*). They begin to be found as soon as we reach a hot climate, say from 3000 feet elevation downwards.

"Rundu," sleet; thus "Rundu-uma," Sleet Head. "Rásu" is snow, and occurs in "Chimbu-rasu, Caraguai-rasu" (Carguairago), and many other names. The vulgar name for snow as it falls is "Papa-cara," *i. e.* potato peelings.

"Pucará" indicates the site of a hill-fort of the Incas, of which a great many are scattered through the Quitonian Andes.

## XII.—*Journey from Quito to Cayambe.* By DR. WILLIAM JAMESON. 1859.

*Read, March 12, 1860.*

A WEEK'S relaxation from my duties at the University of Quito gave me an opportunity of making an excursion to Cayambe, a snowy mountain of imposing aspect, situated E.N.E. of Quito, and, according to Humboldt, directly under the Equator.

Before setting out I shall offer a few observations on the city of Quito, where I have resided for so many years.

Quito is built on what may be called a ledge of the volcanic mountain of Pechincha, at an elevation of 9528 feet above the level of the sea. The mountain rises in the background to a height of 15,976 feet, and is crowned by a wall of trachytic rocks surrounding the crater, the depth of which is 2460 feet; and consequently the bottom, where a volcanic agency is in active operation, is nearly 4000 feet above the level of the city. Snow frequently falls on the sandy desert of the crater; but two or three days of fine weather cause its disappearance, excepting in some